



# Minimizing the Use of Lumber Products in Residential Construction

## Lumber Use Facts



New home construction accounts for 40 percent of the wood consumed in the United

States.

- ◆ Although the U.S. is home to only 5 percent of the global population, it is responsible for over 15 percent of the world's consumption of wood.
- ◆ A typical 1700 square foot wood framed home requires the equivalent of clear cutting one acre of forest.
- ◆ Within U.S. national forests alone, at least 70,000 acres of old-growth timber have been harvested each year since the mid-1980s.
- ◆ Tropical hardwood is especially vulnerable: 42 million acres of tropical hardwood were cleared in 1990, a 40 percent increase from 1980.
- ◆ The traditional building method of stick-built framing has declined from approximately 86 percent in 1995 to 78 percent in 2000. By 2005, the forecast is for stick-built framing to decline further to around 71 percent.

## Lumber Use Reduction Strategies, Technologies and Alternatives



It is estimated that the wood use in home construction can be reduced by 30 percent through reduction, recycling and material substitution. There are several lumber use reduction strategies, technologies and alternatives currently

available to the homebuilding industry:

- ◆ Optimal Value Engineering, also called Advanced Framing, has been promoted for many years as an energy saving technique, but it originally began as a way to save money by reducing lumber use. Advanced Framing develops house plans on 2-foot modules to maximize lumber and sheet materials, locates windows and doors on the 2-foot module to reduce cripples and king studs and locates other studs 24 inches on center, instead of the standard 16 inches on center, for all one- and two-story designs. It eliminates headers in gable end walls, where there is no roof load and carefully sizes headers where they are needed. Metal clips, plastic flanges or blocks of scraps are used to support drywall to reduce lumber use.
- ◆ Replacing stick framing for roofs and floors with truss systems. Trusses not only use smaller dimension lumber, they span greater distances, shrink less, reduce floor squeaks and allow wiring, plumbing and ductwork to run through the floor cavity without cutting or drilling.
- ◆ Replacing stick framing for roofs and floors with I-joint systems. Like truss systems, I-joists are constructed with small-dimension lumber that are often finger-jointed. I-joists span greater distances, shrink less and reduce floor squeaks.
- ◆ Using Laminated Veneer Lumber or Beams rather than large dimension lumber when a more decorative approach is needed. Laminated timbers can be manufactured for large spans and heavy loading. Laminated wood beams reduce large dimension lumber use because they are made of smaller sized lumber glued together to achieve longer and thicker dimensions with superior strength.
- ◆ Using finger-jointed lumber for wall framing. The finger jointing process benefits the lumber manufacturing process by salvaging short lengths from low-quality lumber to make long lengths of higher grade lumber. The builder and homeowner benefit by using a created piece of wood that stays straighter than solid-hewed studs and are nearly impervious to warp and twist.
- ◆ Using non-wood substitutes for many common applications:
  - ❖ Recycled plastic lumber is well suited for outdoor furniture and decks and is currently available nationwide.
  - ❖ Many manufacturers have interior doors made from pressed wood composites.
  - ❖ Linoleum, paver tile and stone floors can replace hardwood flooring.
  - ❖ Oriented Strand Board can be used for floor underlays, cabinet carcasses and shelves.
- ◆ Using reclaimed wood gives wood a second life. Salvaging wood is now a growth industry in the U.S. For example, salvagers dredge logs from the bottoms of rivers and lakes. Others carefully deconstruct old barns, factories and schools. Large beams are re-milled into flooring and trim. The quality of reclaimed wood often exceeds anything available in the current market.
- ◆ Only using wood from lumber companies, certified by an independent third-party certification agency, that practice sustainable forestry. In order for the certification to be credible, it must be performed by an independent third party; if not, there is no guarantee that the approval is not just industry "green washing." The Forest Stewardship Council, an international nonprofit group, is the premier organization for accrediting and certifying timber companies.
- ◆ Using alternative structural materials for exterior and load bearing walls, such as:

## Summary

Wood can be both structural and ornamental. It is used throughout the world for many tasks — from simple structural applications to highly finished and ornate decoration.

Because of wood's varied uses worldwide, many in the building industry are continually faced with issues regarding deteriorating lumber quality, increasing prices and the devastation of old-growth forests.

There are numerous strategies in the residential building design and construction industry that can dramatically reduce the demand for new wood when facing the combination of:

1. Expensive timber,
2. Environmental awareness,
3. Advanced adhesive technologies and
4. The availability of new recovery machinery which has brought many of these strategies to the forefront.

- ❖ Insulated Concrete Forms
- ❖ Autoclaved Cellular Concrete
- ❖ Insulated Structural Panels,
- ❖ Steel studs that provide a high percentage of recycled content. However, if these studs are installed on exterior walls, great attention needs to be paid to preventing thermal transmission and increased air infiltration.

- ❖ Straw Bale

- ◆ Using finger-jointed or profile wrapped wood trims.

## Nebraska Green Building Program



Builders participating in the Nebraska Green Building Program are encouraged to reduce lumber use in all aspects of the construction of their homes. Following lumber use reduction strategies, technologies and alternatives provides participating builders with Green Building "credit" in each of the following phases of construction:

### Site Development

- ❖ Outdoor structures, decking and landscape material made from recycled-content materials such as plastic lumber or borate-treated engineered lumber

### Foundation

- ❖ Rigid insulation forms provide permanent insulation to the foundation

### Exterior Walls

- ❖ Recycled content underlayment and/or sheathing or Oriented Strand Board

## Lumber Reduction Terms

- ❖ **autoclaved cellular concrete** — concrete blocks whose manufacturing process creates tiny voids giving these lightweight blocks an insulating value.
- ❖ **engineered wood** — recycled/reconstituted wood products that are laminated or finger-jointed.
- ❖ **finger-jointed** — this is a manufacturing process splicing short pieces of wood, that often went into the landfill. The pieces of wood have finger-like joints cut into each end and then the pieces are glued together, end to end.
- ❖ **insulated concrete forms (ICF)** — concrete forms that are left in place and have an insulating value.
- ❖ **insulated structural panels (SIPS)** — a type of product whose most common form is the foamcore panel that sandwiches several inches of foam insulation between half inch thick sheets of Oriented Strand Board.
- ❖ **i-joists** — a combination of flanges made from laminated or finger-jointed lumber with webs, generally of Oriented Strand Board. I-joists feature an efficient shape that often allows them to carry large loads over long spans with little swelling or shrinking.
- ❖ **laminated veneer lumber (LVL)** — beams that are glued together from defect-free veneers to achieve longer and thicker dimensions with superior strength with less warping and twisting than is available from solid wood..
- ❖ **oriented strand board (OSB)** — a layered, mat-formed panel product made from strands, flakes or wafers sliced from small diameter, round wood logs and bonded under heat and pressure.
- ❖ **profile wrapped products** — the core of the trim is made from fast-growing, second-growth timber in the form of finger-jointed wood or medium-density fiber board that is wrapped with material made of increasingly scarce high grade lumber. A wrapped door jamb uses less than 3 percent of the high grade lumber needed to make a solid wood jamb.



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- ❖ Agricultural by-product sheathing
- ❖ Straw/mud or rammed earth
- ❖ Straw bale technique
- ❖ Engineered wood sub-fascia, soffit or trim

## Doors

- ❖ Reconstituted or recycled-content interior doors with least toxic binders
- ❖ No Luan doors (tropical hardwood)
- ❖ Solid, domestically-grown or domestic hardwood interior panel doors
- ❖ At least 50 percent of the doors are of recycled content

## Windows

- ❖ Finger-jointed wood windows

## Structural Frame

- ❖ Use of large dimension solid lumber that is 2 x10 or greater is avoided
- ❖ Engineered wood I-joists used for floor
- ❖ Trusses or I-joists used for roofs
- ❖ Finger-jointed top and bottom plate material
- ❖ Finger-jointed studs or engineered stud material
- ❖ Structural Insulated Panels used for walls or roofs
- ❖ Engineered lumber products for beams, joists or headers
- ❖ Optimum value engineering framing (24" O.C. studs, 3 stud or less corners, etc.)
- ❖ Engineered alternatives to wood framing
- ❖ Steel studs used in more than 90 percent of the interior walls

## Finishes and Adhesives

- ❖ Agricultural by-product paneling

## Cabinetry and Trim

- ❖ Tropical hardwood trim or cabinets only from certified sustainably-managed forests
- ❖ Finger-jointed trim
- ❖ Domestic hardwood trim
- ❖ Recycled trim
- ❖ Solid domestic hardwood cabinets

## Resources

Green Alliance Definitions <http://www.greenalliancecnm.org/Definitions.htm>  
Oikos Green Building Source "To save trees, cut wood" <http://oikos.com/esb/54/wood.html>  
Resource Conservation Alliance "Forest Protection and Design Choices: Using Less Wood in Buildings" by Ann V. Edminster <http://www.rca-info.org/bldg.html>  
Woods Markets Monthly August 2001 <http://www.fillerking.com/Laminated%20Beams.htm>  
Wood Information Bureau - Be Constructive - Finger Jointed Lumber [http://www.beconstructive.com/professionals/21st\\_fingerjoined.asp](http://www.beconstructive.com/professionals/21st_fingerjoined.asp)  
Green Finger Jointing Recovery and Adding Value All in One Shot <http://www.auburnmachinery.com/PRPAGES/gfjvalue.htm>

*Minimizing Use of Lumber Products in Residential Construction* is one in a series of factsheets that include:

1. Construction Waste Minimizations Methods
2. Efficient Design and Construction
3. Site Development for Environmental Preservation and Energy Efficiency
4. Recycled Construction Materials
5. Low Water Use Benefits

Other factsheets and additional information can also be found at:  
[www.nol.org/home/NEO/home\\_const/main.htm](http://www.nol.org/home/NEO/home_const/main.htm)



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